

Attorney's Docket No. : 378/9-1917  
U.S. Application No. : To be assigned  
Filed : Herewith - March 29, 2004  
Applicant(s) : Bjarne NIELSEN  
International Application No. : PCT/DK02/00673  
International Filing Date : 8 October 2002  
Priority Date Claimed : 18 October 2001 (PA 2001 01531)  
Title of Invention : A METHOD AND MEANS OF THAWING MEAT AND USE THEREOF

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

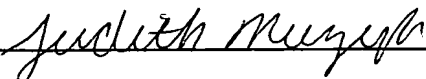
1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures [35 U.S.C. 371 (f)] at any time rather than delay examination until the expiration of the applicable time limit set forth in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed [35 U.S.C. 371(c)(2)]
  - a) ☐ is transmitted herewith (required only if not transmitted by the International Bureau)
  - b) ☒ has been transmitted by the international Bureau
  - c) ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English [35 U.S.C. 371(c)(2)]
7. ☐ Amendments to the claims of the International Application under PCT Article 19 [35 U.S.C. 371(c)(3)]
  - a) ☐ are transmitted herewith (required only if not transmitted by the International Bureau)
  - b) ☐ have been transmitted by the International Bureau
  - c) ☐ have not been made; however, the time limit for making such amendments has **NOT** expired.
  - d) ☐ have not been made and will not be made
8. ☐ A translation of the amendments to the claims under PCT Article 19 [35 U.S.C. 371(c)(3)]
9. ☐ An oath or declaration of the inventor(s) [35 U.S.C. 371(c)(4)]
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 [35 U.S.C. 371(c)(5)]

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98 (3 docs.)
12. ☐ An Assignment document for recording. A separate cover sheet (PTO-1595) in compliance with 37 CFR 3.28 and 3.31 are included.
13. ☐ A **FIRST** preliminary amendment
14. ☒ A **SECOND** or **SUBSEQUENT** preliminary amendment
14. ☒ **THE APPLICANT AND/OR ASSIGNEE, IF ANY, HEREBY CLAIMS SMALL ENTITY STATUS.**
15. ☐ A change of power of attorney and/or address letter
16. ☒ (other items or information) **A clean copy of the application; PCT Pub. No WO 03/032740 A1; Application Data Sheet**

EXPRESS MAIL No.: EV332302685US Deposited: March 29, 2004

I hereby certify that this correspondence is being deposited with the United States Postal Service Express mail under 37 CFR 1.10 on the date indicated above and is addressed to: Mail Stop PCT, Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.



Date: March 29, 2004

U.S. Application No. (if known, see 37 C.F.R. 1.50):  
International Application No.: **PCT/DK02/00673**

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07:11 Rec'd PGT/PTO 29 MAR 2004  
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17. ☒ The following fees are submitted:

BASIC NATIONAL FEE [37 CFR 1.492(a)(1)-(5)]:				CALCULATIONS	PTO USE ONLY
<input checked="" type="checkbox"/> Search Report has been prepared by the EPO or JPO.....			\$920.00		
<input type="checkbox"/> International preliminary examination fee paid to USPTO [37 CFR 1.482].....			\$730.00		
<input type="checkbox"/> No International preliminary examination fee paid to USPTO [37 CFR 1.482] but International search fee paid to USPTO [37 CFR 1.445(a)(2)].....			\$50.00		
<input type="checkbox"/> Neither International preliminary examination fee [37 CFR 1.482] nor International search fee [37 CFR 1.445(a)(2)] paid to USPTO.....			\$ 1080.00		
<input type="checkbox"/> International preliminary examination fee paid to USPTO [37 CFR 1.482] and all claims satisfied provisions of PCT Article 33(1)-(4).....			\$00.00		
<b>ENTER APPROPRIATE BASIC FEE AMOUNT:</b>				<b>\$ 920.00</b>	
Claims	Number filed	Number extra	Rate		
Total Claims	20-20=0	x	\$ 18. =		
Indep. Claims	1-03=0	x	\$ 86 =	\$	
<input type="checkbox"/> Multiple Dependent Claim(s) (if applicable)			+ 290.00	\$	
<b>TOTAL OF ABOVE CALCULATIONS:</b>				<b>\$ 920.00</b>	
Surcharge of \$130.00 for furnishing the oath or declaration later than [ ] 20 [X] 30 months from the earliest claimed priority date [37 CFR 1.492(e)]				\$	
<b>TOTAL OF ABOVE CALCULATIONS:</b>				<b>\$ 920.00</b>	
Reduction by ½ for filing by small entity, if applicable. [Note 37 CFR 1.9, 1.27, 1.28]				\$ 460.00	
<b>SUBTOTAL:</b>				<b>\$ 460.00</b>	
Processing fee of \$130.00 for furnishing the English Translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date [37 CFR 1.492(f)]					
<b>TOTAL NATIONAL FEE:</b>				<b>\$ 460.00</b>	
Fee for recording the enclosed assignment [37 CFR 1.21(h)] The assignment must be accompanied by an appropriate cover sheet (PTO-1595) [37 CFR 3.28, 3.31]. \$ 40.00 per property +				\$	
<b>TOTAL FEES ENCLOSED:</b>				<b>\$ 460.00</b>	
				\$	
				\$	

☒ A check in the amount of **\$460.00** to cover the above fees in enclosed.

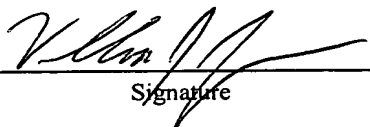
☒ The Commissioner is hereby authorized to charge the deposit account any other fees required with this submission or to credit any overpayment to Deposit Account No: 04-0838. A duplicate of this form is enclosed.

**NOTE:** Where an appropriate time limit under 36 CFR 1.494 or 1.495 has not been met, a petition to revive [37 CFR 1.137(a) or (b)] must be filed and granted to restore the application to pending status.

**SEND ALL CORRESPONDENCE TO:**

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32,518      March 29, 2004  
Reg. No.      Date

A METHOD OF THAWING MEAT AND USE THEREOF

5 The invention relates to a method of thawing one or more frozen blocks of meat having a temperature  $T_1$ , said blocks of meat being composed of units of meat frozen together.

10 Thawing of meat is frequently a process stage which must be carried out before further process stages, such as preservation, addition of salts, drying, heat preparation, packing, etc., take place. Thawing is carried out e.g. by removing the meat from a freezer room and storing the meat in a room at a temperature above the freezing point of the meat at the prevailing atmospheric pressure for a period of time which is required in order for the meat to thaw and be ready for the next process stage.

15 In certain industrial processes, large amounts of meat are present in smaller units of meat, which are e.g. cut, cleaned or the like pieces of meat. Freeze storage of large amounts of meat causes the smaller pieces to freeze together to individual larger blocks of meat, unless special measures  
20 are taken, such as individual packing of the units of meat before freezing. Since this measure is a time- and resource-consuming intermediate stage, it is frequently left out, and the situation prior to the thawing of the meat is therefore that large amounts of meat have most frequently frozen together. It may be a time-consuming process to thaw the meat by simple storage of  
25 the meat at a temperature higher than the freezing point of the meat, since large blocks of meat consisting of numerous units of meat require a considerably longer period of thawing than each individual unit of meat. Typically, the block of meat will thaw inhomogeneously, so that the units of meat near the surface have thawed after a while, while pieces of meat not close to the  
30 surface are still frozen.

The object of the invention is to provide a method of thawing a block of meat consisting of smaller units of meat with a considerably shorter period of thawing than if the block of meat was to thaw by simple storage at a temperature above the freezing point of the block of meat at the prevailing atmospheric pressure, and to provide a more homogeneous thawing of the meat units of the block of meat.

The object is also that during this thawing a supply of additives takes place, as brine with expedient substances, e.g. salts with phosphates or chlorides, is added.

This object is achieved by a method like the one stated in the opening paragraph, and wherein also the frozen blocks of meat are placed in a drum of a massage system, said drum comprising massage wings/carriers, wherein a supply of liquid at a temperature  $T_2$  takes place in the interior of the massage wings, said temperature being higher than  $T_1$ , said supply generating a temperature  $T_3$  on the surface of the massage wings/carriers, said temperature  $T_3$  being higher than  $T_1$ , and wherein the brine having a temperature  $T_4$  is supplied to the drum, said temperature  $T_4$  being higher than  $T_1$ .

One or more frozen blocks of meat having the temperature  $T_1$  are placed in the massage system, whereby they get into contact with the inner drum of the massage system. The carriers of the drum are kept at a constant temperature which is higher than  $T_1$  and above the melting point of the liquid contained in the block of meat, which causes the blocks of meat to thaw. The liquid in the interior of the carriers preferably has a temperature  $T_2$  in the range 10 – 40 °C, which results in a surface temperature  $T_3$  of the carriers which is preferably 1 – 2 °C lower than  $T_2$ . When simultaneously supplying a brine having a temperature  $T_4$  lower than or equal to  $T_2$  and approximately differing 1 – 2 °C, the block of meat is caused to contact a heat

reservoir of greater heat capacity than the one originating from the inner surface of the drum alone, which reduces the period of thawing. The drum rotates, thereby increasing the heat exchange between the block of meat, the units of meat, the brine and the interior of the drum, and resulting in a mechanical impact between the carriers and units of meat in the surface of the block of meat, which causes the units of meat to be loosened from each other, which increased heat exchange and mechanical impact also reduces the period of thawing. By providing a negative pressure in the drum it is ensured that the boiling point of the liquids in the drum is reduced and particularly that the vapour pressure increases, equivalent to an increase in the evaporation, which is likewise instrumental in reducing the period of thawing.

By using the method according to the invention as stated in claim 2, it is moreover ensured that the boiling point of water is reduced relative to the boiling point of water at atmospheric pressure, whereby the period of thawing is reduced additionally.

By using the method according to the invention as stated in claims 3 – 4, it is moreover ensured that the heat exchange effect between blocks of meat, brine and drum walls is increased additionally, and that the block of meat as a whole is affected mechanically, which is instrumental in separating the block of meat into its individual units of meat and results in a reduction in the period of thawing of the meat.

By using the method according to the invention as stated in claims 5 – 8, it is moreover ensured that the thawing temperatures are controlled, so that the meat is not damaged in the thawing, and expedient heat conduction takes place from the carriers to the brine and to the block of meat.

By using the method according to the invention as stated in claim 9, it is moreover ensured that the liquid used for heat exchange between the carriers and the meat is readily accessible and of a particularly simple composition.

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By using the method according to the invention as stated in claim 10, it is moreover ensured that the boiling point of water is reduced relative to the boiling point of water at atmospheric pressure, whereby the period of thawing is reduced additionally.

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By using the method according to the invention as stated in claim 11, it is moreover ensured that the units of meat and the block of meat are massaged in the massage system.

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By using the method according to the invention as stated in claim 12, it is moreover ensured that there is an option between soft or hard massage of the units of meat and the block of meat.

The invention also relates to use of the method of thawing blocks of meat.

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The invention will now be explained more fully with reference to the drawing, in which

fig. 1 shows a massage system seen from the side,

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fig. 2 shows a frozen block of meat,

fig. 3 shows an open massage drum seen from the end,

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fig. 4 shows a detailed view of a massage wing seen in section.